IMITATION CHEESE COMPOSITIONS FOR USE IN THE MANUFACTURE OF CHEESE LOAVES, SLICES AND THE LIKE, AND METHOD OF PRODUCING SUCH COMPOSITIONS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 09/888,720, filed on Jun. 25, 2001, which application is incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] The present invention relates to an acidified imitation cheese composition having a good shelf life, having good mouthfeel and taste, which can be manufactured into imitation hard, soft, or semi-soft cheeses and safely packaged using virtually any commercial packaging system, including hotfill, retort, or aseptic systems. The acidified imitation cheese composition ofthe invention can be used to make an assortment of imitation cheese products, including, but not limited to, imitation cheese loaves, logs and balls, imitation cheese sheets, imitation cheese wheels, imitation cheese slices, and imitation grated and shredded cheeses in a variety of flavors and colors.

[0003] Pasteurized process cheese products have been on the market for many years and are usually sold as shelf stable products. These products, such as the cheese slices used in the cheeseburgers of most American fast food restaurants, are favored by consumers and food service providers alike because of their versatility, shelf stability, and lower cost in comparison to natural cheese products. Pasteurized process cheese products typically have a relatively high pH (about 5.4 to 6.0) and a moisture content of approximately 50%. Because of their high pH, pasteurized process cheeses products fall into the category of "low acid food products" as defined in 21 C.F.R. § 114.3(d) (foods having a pH of greater than 4.6). It is well known in the industry that low acid products can easily become spoiled by microbial growth, thereby creating an unpleasant and potentially dangerous culinary experience for the consumer if handled or packaged improperly. To reduce the ever-present danger of microbial growth in low acid foods, in particular, contamination by *Clostridium botulinum,* the food industry has developed various methods of preservation applicable to low acid foods. Many low acid products are preserved by application of a high-temperature thermal treatment, such as sterilization, to a finished product, thereby destroying any viable bacterial contaminants. Commonly used food manufacturing procedures, such as aseptic and retort processing, incorporate these high heat treatments.

[0004] While effectively enhancing food safety, food sterilization through thermal processes has some inherent drawbacks. Both aseptic processing and retort processing require heating the finished product to high temperatures (around 121° C.-148° C. or 250° F.-300° F.) to accomplish sterilization. In addition to increased energy and equipment expenditures, high temperature processing can result in what is referred to as "burn on," linescale, or fouling of the product, where a commercially unacceptable burned or overcooked taste is imparted. Fouled product is unsaleable and is therefore discarded, resulting in a waste of materials and labor. Accordingly, the productivity and profitability of the manufacturing process is decreased.

[0005] Additionally, thermally sterilized food products must be retained by the manufacturer, by law, for an incubation period before releasing the product to the consumer. The finished product must be held in incubation for a minimum of approximately ten days before shipping, in order to verify that the sterilization process was adequate.

[0006] As an alternative to thermal sterilization, shelf stability can be achieved in some types of low acid products by control of the nature and amount of the various components which make up the substance of the food product. Preservatives may be added to the product, or bacterial growth may be controlled by limitations on the water activity (a_w) of the product's composition. However, these preservation methods have drawbacks which limit their practical applicability in large scale production and distribution situations. For example, foods containing large quantities of preservatives are disfavored by consumers, and enhanced shelf stability through control of water activity is feasible in only a narrow range of product types, because of the limitations placed on the composition of the product itself.

[0007] In the case of pasteurized process cheese products, bacterial stability is most often achieved though use of what is known in the art as "hurdle technology," a combined effect of carefully restricted levels of pH, moisture (water activity a_w), and salts (emulsifier phosphates and NaCl) in the process cheese composition, which is generally accepted in this field. Hurdle technology and its applications in the area of food preservation are well known and documented in the art, e.g., Tanaka, *J. Food Protect.,* vol. 49, no. 7, pp. 526-531 (July 1986), the contents of which are incorporated herein by reference.

[0008] The hurdle technology food preservation model predicts the level of bacterial stability of a given composition, depending on the specific levels of each the four parameters ("hurdles") of pH, moisture, emulsifier phosphates, and NaCl present in the composition. However, because the effects of variations or deviations from any of the prescribed parameters are unpredictably synergistic, the hurdle predictive models have created a paradigm of the specific component levels. Therefore, production-scale hurdle manufacture is limited to a narrow range of permutations of each of the parameters, and is limited to a relatively low level of moisture in the product (58% moisture by weight, or less), in order to ensure proper preservation of the resultant food product.

[0009] In contrast to low acid foods, including pasteurized process cheeses, "acidified" foods, as defined in 21 C.F.R. § 113.4(a), do not require application of any of the preservation techniques discussed above. Because such products are less susceptible to microbial spoilage by virtue of their acidic pH, they can be formulated for taste, texture, and cost advantage without regard to the effects of high heat sterilization or parameters of moisture or other "hurdles."

[0010] Significantly, an acidified cheese-type product could be formulated without regard to the moisture parameter required by the hurdle processing of pasteurized process cheese. Thus, the overall moisture content of the cheese-type product could be drastically increased, thereby conferring a significant economic advantage upon the manufacturer, who may replace the costly solids components with less expensive water or moisture components, while maintaining food